INCREMENTAL MAGNETIC RECORDER MODEL DS370

KENNEDY COMPANY

Accurate Stepper Drive

Fast Tape Skipping for Gaps

Optional Read

Built-in Parity Generation

Echo Check

Automatic Gap Generation

Full Servo Controlled Tape Reels

Rugged Construction

Remote Operation

Beginning and End of Tape Sensing

The Kennedy DS370 Incremental Magnetic Tape Recorder prepares standard computer tapes from sources of input data operating at non-standard or random rates. Asynchronous or step at a time operation obviates the necessity for extensive buffering required with conventional transports. Input data may originate with typewriters, keyboards, teletype lines, digital voltmeters, counters, or other sources of low to medium speed digital information.

Tapes are recorded with uniform character density even with random inputs. Necessary gaps and marks are recorded to make tapes fully IBM compatible.

In addition to the incremental drive, the DS370 provides a constantly rotating capstan with pinch roller tape engagement. This drive is normally used for advancing tape quickly for gap insertion thereby further reducing buffering requirements.

This exclusive DS370 feature allows a ¾ inch record gap to be inserted in less than 50 milliseconds reducing data interruptions or buffering to a minimum. Fast gap insertion is also used for file gaps.

If desired, the constantly rotating capstan may be used to drive tape forward in continuous or start-stop mode. Thus the DS370 may be equipped for continuous read or write in addition to its incremental capability.

INCREMENTAL DRIVE

Tape is driven incrementally by a capstan rotating in steps precisely equivalent to .005″ on the tape. One step is made for each input pulse. Recording takes place with the tape stationary at the beginning of the step.

The step motor drive has the advantage of magnetically detented positions which are part of the motor construction. The capstan is held firmly in known position by the magnetic detent when idle.

Asynchronous stepping rates up to 300 characters per second allow recording of data from relatively high speed sources. Higher synchronous rates up to 1200 characters per second are possible by programming the start over several steps.

Tape is held in engagement with the incremental capstan by means of a solenoid operated pinch roller which also serves as a brake when the DS370 is used in the start-stop mode.

CONTINUOUS DRIVE

Mounted directly below the incremental drive is the continuously rotating capstan and associated pinch roller. This drive, operating at 1800 rpm, may be engaged to drive tape forward at 30 inches per second either automatically for fast gapping or by the Forward pushbutton for rapidly advancing tape.

DS370 machines which have been equipped for reading use the fast capstan for forward drive. For reading or continuous write a two or three speed motor can be supplied to allow rates different from the standard 30 ips.

HEAD AND GUIDE ASSEMBLY

For extra rigidity and precision, the magnetic head,

guides, and capstans are mounted on a heavy plate separated from the main machine panel. The tape line is straight making loading a simple operation. Guiding is accomplished by two cylindrical guides mounted on either side of the head. Guides may be rotated to a new position if, after long service, they become worn.

REEL DRIVE

Reels are full servo controlled to assure constant light tape tension and to allow the rapid tape motion associated with fast gapping and start-stop operation.

Induction torque motors driven by full linear servo amplifiers are used for reel drive. Motors drive through 3:1 timing belt reduction to provide adequate torque without high power consumption. All shafts are ball bearing supported.

Tape tension is sensed by lightweight arms operating potentiometers at the servo input. Arms are supported on ball bearing shafts.

In rewind operation the two servo amplifiers are interconnected to provide automatic tape tension limiting. Thus it is impossible to overstrain the tape at the high rewind speed where this might otherwise be a danger.

Reel hubs for IBM reels are normally supplied but NARTB hubs are also available. Reels are locked firmly in place by means of a rubber expansion ring secured by a half turn of the locking handle.

ELECTRONICS

Printed circuit cards for the necessary electronics are mounted in a card cage on the rear side of the main panel. Write amplifiers and control logic for gap insertion, parity check and machine functions are included.

Logic levels have been selected to be as universal as possible. In general, functions are initiated by logical ones and true outputs are indicated by logical ones. Input levels are –5 volts minimum for one and 0 volts ±.5 volt for a zero. Source impedance of outputs is 1000 ohms or less. The electronic portion is all solid state and no relays or SCR's are used keeping generated noise to an absolute minimum.

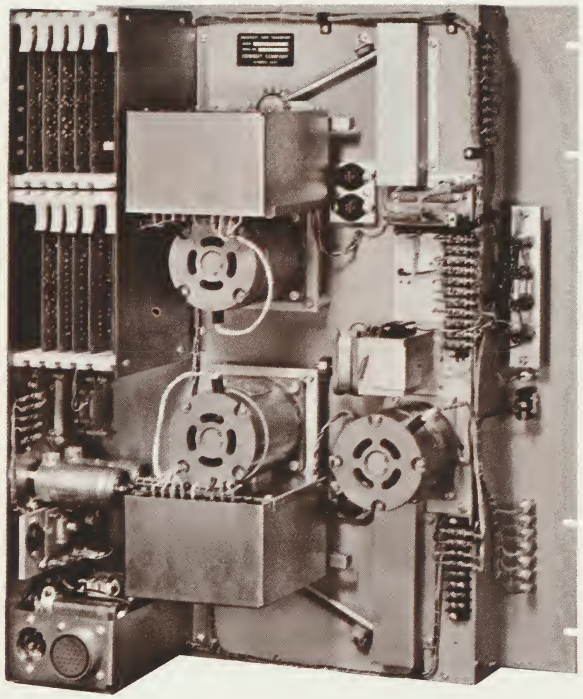
When the DS370 is supplied for read as well as write, an additional card cage is used to hold the necessary read amplifiers and deskewing logic. This card cage occupies an additional 7" of rack space directly below the DS370.

CONTROLS AND INTERLOCKS

Four momentary, lighted pushbuttons are provided for control of the DS370. All pushbutton functions are duplicated by remote inputs allowing automatic operation under computer control where applicable.

Interlocks are provided to minimize possibility of operational error. For instance, rewind, once initiated, cannot be stopped until the beginning of tape reflective strip is sensed at which time the tape automatically comes to rest.

Photo-electric sensing is provided for beginning of tape, end of tape and broken or missing tape as standard equipment. In addition the DS370 can be supplied with file protect feature requiring presence of the standard IBM file protect ring for recording.



MACHINE CONSTRUCTION

The DS370 is ruggedly built for trouble free operation under severe environments.

Main machine panel is 3/8" aluminum plate supported by 12 gauge steel side angle. All shafts rotate in sealed ball bearings lubricated for life. All metal surfaces are treated for corrosion resistance in accordance with applicable mil specs.

The front door is made of tempered plate glass solidly supported at the hinge side. Rubber seal strips prevent dirt from entering the front transport section.

Modular construction allows removal of any assembly without disturbing machine wiring.

Printed circuit boards are epoxy glass with gold plated conductors and nickel-rhodium tips.

SPECIAL OPTIONS AND FEATURES

The DS370 is normally supplied as described above. A number of variations and options are available however, typically those listed below.

1. Continuous read/write
2. 556 BPI density
3. File protect switch
4. Special paint color
5. Transport only, less write and control electronics but with servo amplifiers and step motor drive
6. NARTB reel hubs
7. Different tape width and number of channels. (Up to 1 inch)
8. Different packing density.

Specifications

Stepping rate—Zero to 300 steps/second
Skipping rate—30 inches/sec.
Stepping increment—IBM low density, 200 bits/inch
Recording mode—NRZI
Number of tracks—Seven on ½ inch tape
Tape reels—Standard 10½ inch IBM reel with 2400' tape capacity
Magnetic tape—1.5 mil mylar
Rewind tape—Less than four minutes for 2400'

INPUT REQUIREMENTS

Data signals—6 inputs, voltage level –5V or greater represents "1," OV or open input represents "0"
Write command—Pulse –5V or greater. Minimum pulse duration, 10 microseconds, maximum rate, 300/sec
Vertical parity—Internally generated either odd or even
Record gap command—Pulse –5V or greater. DS370 automatically inserts longitudinal check character and then skips tape ¾" for end-of-record gap
Record gap time—Less than 50 milliseconds
File gap command—Pulse –5V or greater. DS370 automatically inserts longitudinal check character, skips 3¾" file gap, writes file mark with check character, skips ¾" gap
File gap time—Less than 175 milliseconds
Beginning-of-tape-gap—The WRITE pushbutton skips the tape 3.4 inches past the beginning-of-tape reflective strip, uniformly magnetizing the tape in accordance with IBM practice

REMOTE CONTROLS

Remote forward— –5V level
Remote rewind—Pulse –5V or greater 10 usec min. pulse duration
Remote write—Pulse –5V or greater 10 usec min. pulse duration

RECORDER OUTPUTS

End-of-tape sensor— –10V level, end of tape
Broken/missing tape sensor— –10V level, missing tape
Echo check—Odd and Even parity check signal. If odd parity is employed during recording then the Even parity echo check will be energized at every write cycle indicating that recording is taking place while odd parity echo check will be energized only in case of a recording error. Echo check outputs –10 pulse
Parity—Internally generated parity pulse brought out as echo pulse from channel C. Positive going –10 to 0 duration approx. 25 usec

OPERATING FEATURES

Controls(1) Power On-Off
(2) Write Pushbutton—energizes record heads in the RESET condition, skips the tape 3.4 inches to produce the beginning-of-tape gap. Lights indicator when DS370 ready to record
(3) Rewind Pushbutton—releases capstan, de-energizes head current, rewinds tape past the beginning of tape marker by energizing reel servo motors. Lights indicator during rewind operation
(4) File Gap Pushbutton—initiates file gap sequence as described above. Lights indicator during sequence
(5) Forward-Load Pushbutton—energized fast forward capstan. Indicator lit during forward run
Indicators(1) Power On-Off
(2) Seven indicators labeled 1, 2, 4, 8, A, B, C, showing state of write flip-flops. Indicators switch on and off during normal writing

FINISH—Light Gray Federal Standard 26440
POWER REQUIREMENTS—115V ±10%, 60 cps, AC 150VA
SIZE—Fits standard 19" relay rack 24½" panel
WEIGHT—85 lbs.

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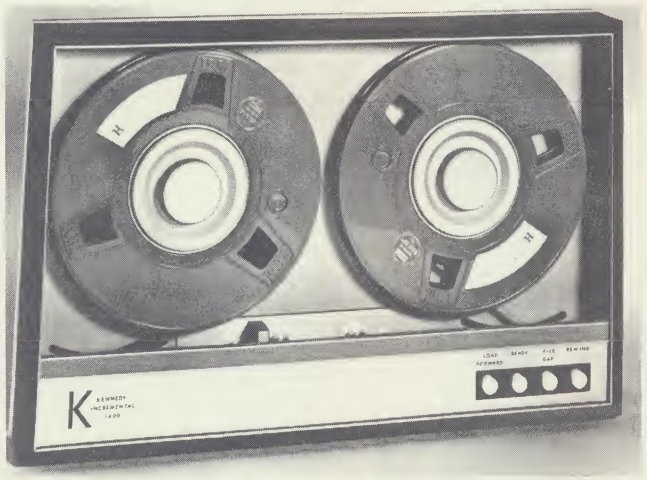
MODEL 1400

Preliminary Data Sheet

New KENNEDY MODEL 1400



Incremental Magnetic Recorder offers an economical approach to preparation of computer tapes from sources of variable or non-standard speed data.

Asynchronous incremental operation at rates up to 200 steps per second eliminates the need for buffering when working with data communication systems, digital voltmeters, film readers, business machines and similar devices. Tapes produced are fully IBM compatible including necessary gaps, parity and special marks, and may be utilized on any low density IBM tape transport.

The Model 1400 includes transport mechanism controls and all necessary electronics in a single 19" x 12¼" x 12" rack cabinet. Access is entirely from the front of the unit.

Electronics for the Model 1400 utilizes silicon semiconductors exclusively; however, either positive or negative logic may be used externally.

Special versions of the Model 1400 are available for higher stepping rates and densities, continuous and incremental read as well as write, and DC operation.

STANDARD SPECIFICATIONS

Record Mode	NRZI
Character density	200/inch
Number of Channels	7 IBM Compatible
Stepping rate	0 - 200 steps (.005")/sec
Reel Size	8½" IBM Standard
Reel Capacity	1200 feet ½" 1.5 mil Computer Tape
Information Capacity	2, 880, 000 seven bit characters
Parity	Internally generated vertical (odd or even) and longitudinal
Record gap	¾" internally generated. Gap time less than 200 msec.
File gap	3.5" with file mark internally generated
Beginning of tape gap	3.5" automatic
Controls	
Load Forward	Advances tape to Load Point in loading operation. Advances tape in normal Forward operation
Ready	Indicator only. Indicates machine is ready to accept inputs
File gap	Inserts standard file gap. (External input also available
Input Requirements	
Data	Six lines positive or negative logic (specify)
Data logic levels	
Positive	+5V Min. (one) OV (Zero)
Negative	–5V Min. (one) OV (Zero)
Write (Step) Command	Pulse 10 usec min. +5V (–5V)
Record Gap Command	Pulse 10 usec min. +5V (–5V)
File Gap Command	Pulse 10 usec min. +5V (–5V)
Dimensions	19" wide × 12¼" high × 12" deep
Weight	50 lbs.
Power	115V 50/60 cps 110VA

Incremental Magnetic Recorders/SHORT-FORM CATALOG

KENNEDY COMPANY

KENNEDY COMPANY

INCREMENTAL DIGITAL MAGNETIC TAPE RECORDERS

MODEL DS370

DESCRIPTION

The DS370 and others in this series are incremental magnetic tape recorders that prepare standard computer tapes from input sources operating at random or non-standard rates, with uniform character density and all gaps and marks for full IBM compatibility. A constantly rotating capstan allows high speed gap insertion or continuous read or write if required. Step-at-a-time operation eliminates buffering. Step motor drive with magnetic detents produces accurate steps at high rates. Typical data input sources are typewriters, keyboards, teletype lines, digital voltmeters, counters or other sources.

BRIEF SPECIFICATIONS

Step rate: 0-400/sec.

Skip rate: 30"/sec.

Step increment: IBM 200BPI (556 BPI if required)

Record Mode: NRZI

Tracks: 7 on 1/2" tape

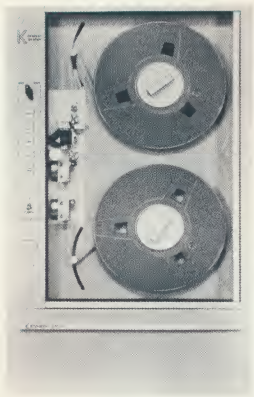
Reels: 10-1/2" IBM

Rec. Gap time: 50 msec.

File gap time: 175 msec.

DS370H High Speed version of DS370 above but rated at 0-500 steps/sec.

Step rate: 0-500/sec.



MODEL DS370 R

DESCRIPTION

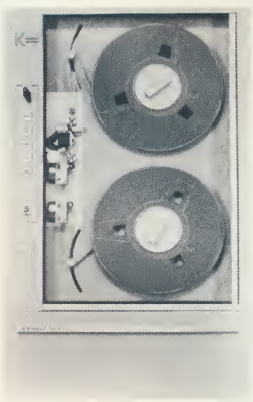
Continuous reading at 30 inches per second is the feature of the DS370R. Equipped with a read-write head; file protect and read electronics in a separate 7" card cage, the DS370R can also be furnished for any one of the following speeds: 10, 15, or 20 IPS. The DS370R will start and stop in a standard 3/4" gap.

BRIEF SPECIFICATIONS

Read Speed: 30 IPS

Optional Speeds: 10, 15, 20 IPS.

Record: same as DS370 or DS370H



MODEL DS370 IR

DESCRIPTION

The DS370IR (INCREMENTAL READ) adds the versatility of reliable incremental reading of magnetic tape at 150 characters per second to the usual incremental write capabilities of the DS370. 200 BPI computer tapes may be read one character at a time, eliminating buffers in such applications as printer operation, data communications and tape-to-tape converters.

Incremental read rate: 150 steps/sec.

Record: Same as DS370 except 300/sec maximum stepping rate.

FLUX-CHECK ™ a new development providing instant verification of data written on tape is applicable to any IBM compatible tape recorders described in this catalog.

In the Flux-Check ™ system, each character is read immediately after recording to verify that it appears on the tape in the intended form. Output of a bit-by-bit check signals any errors which might occur owing to bad tape, failure of the tape advance mechanism, or any other cause.

Flux-Check ™ overcomes the last remaining objection to the replacement of punched tape by magnetic tape—that of non-visible data. With Flux-Check ™ the many advantages of magnetic tape may be utilized without payment of this sometimes decisive penalty.

Flux-Check ™ is not a simple echo check which merely determines that the machine electronics are operating. Data on the tape is actually read in time to effect corrective action before the succeeding character.

Tapes produced on machines equipped with Flux-Check ™ are fully IBM compatible and may be read on any IBM 729 series transport.

CARTRIDGE LOADING DIGITAL MAGNETIC TAPE RECORDERS

MODEL 1400

DESCRIPTION

Model 1400 is a compact, inexpensive incremental magnetic recorder for IBM compatible recordings in low-cost systems. Expensive buffering not required because of rapid asynchronous operation. Parity, beginning of tape, record and file gaps all internally generated. 8-1/2" IBM reels permit small size, yet hold more than 2-1/2 million characters. Model 1400 is also available in incremental and continuous read/write versions.

Step rate: 0-200/sec.

Size: 19" x 12-1/4" x 12" deep.

Character Density: 200/inch std.
556 available

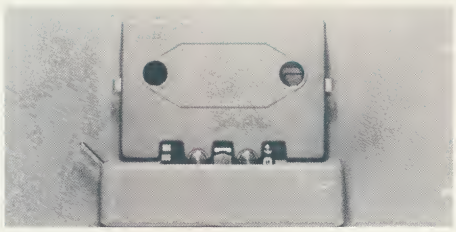
Record Gap: .75"

File Gap: 3.5"

Beginning of tape: 3.5"

Rewind time: less than 3 min.

Weight: 50 lbs.



MODEL DS300

DESCRIPTION

A compact, ruggedly designed incremental magnetic tape recorder with convenient, fast loading cartridges that will record IBM compatible tape asynchronously up to 500 characters per second. Kennedy C-11 cartridges, used in 300 series machines, hold 300' standard computer tape with capacity of 720,000 characters @ 200/BPI. Tapes may be re-wound on IBM reels, or read with Kennedy cartridge readers.
DS300 conforms to MIL-E-16400.

BRIEF SPECIFICATIONS

Record Mode: NRZI

No. Tracks: 7 IBM Compatible

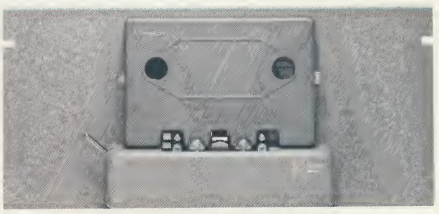
Density: 200/in.

Cart. Cap: 300' 1/2" 1.5 mil.

Step rate: 0-500/sec.

Size: 19" x 8-3/4" x 8" deep

Weight 25 lbs.



MODEL MR303

DESCRIPTION

For applications requiring a low speed, bi-directional magnetic tape transport of rugged design. Operating at an easy 6 IPS, the MR303 transfers data at 1200 characters/sec. Useful for ground support applications and input-output to small computers. Normally supplied deck only, full range of read-write electronics available. Construction conforms with MIL-E-16400.

Specifications same as DS300—except continuous motion.

Start-stop time: 6 msec.
Forward: 6 msec.
Reverse: 14 msec.

Rewind: 30 sec.

OPTIONAL ELECTRONICS

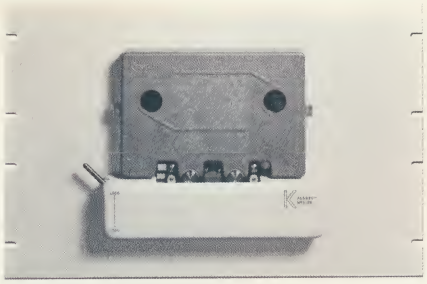
C-11 Cartridge type recorders, with the exception of the DSP340 are offered as decks without electronics because of the variations which may occur in individual applications. A full range of appropriate electronics can be assembled from standard cards.

Electronics can be supplied to either commercial or military standards, with positive or negative logic levels.

Card mounting can be in standard Kennedy Card racks (See DS370IR photo) or in sizes to fit customers' card cages.

Let us quote on your exact electronics requirements.

CARTRIDGE LOADING DIGITAL MAGNETIC TAPE RECORDERS

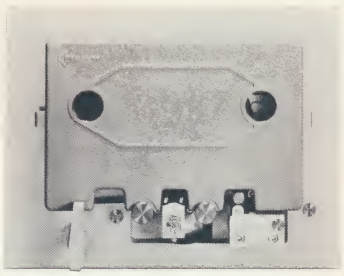


MODEL MR303 B

DESCRIPTION

Similar to the MR303, the MR303B is a unidirectional cartridge loading, continuous motion transport. Standard tape speed is 6 IPS with start/stop time of 5 msec. Typical applications include programming, machine tool control, etc. The MR303B can be supplied with read, write or read/write electronics. Construction is not Mil Spec but to highest commercial standards.

Specifications same as MR303—except high quality commercial construction instead of Mil Specs.



MODEL DSP340

DESCRIPTION

Small size and economical of current, the DSP340 records IBM compatible data under conditions where supply current and/or space is limited. Because heavy current is drawn only when actually stepping, long operating periods with minimum battery drain are possible. Typical applications are oceanographic, meteorological and nuclear monitoring and instrumentation. The DSP340 is recommended for any portable application requiring IBM compatible tape. Included is a seven channel low drain write amplifier (unmounted).

BRIEF SPECIFICATIONS

Step rate: 0-50/sec.

Standby current: 300 uamp (approx)

Peak current: .5 amp @ 12 msec/step

Battery voltage: 12 or 24 V (specify)

Size: 8-1/2" x 11" x 4" deep.

Weight: 9 lbs.

MODEL M201

DESCRIPTION

Costing no more than most punched paper tape equipment, the M201 offers the speed, convenience and simplicity of magnetic tape recording. One machine both reads and writes at speeds beyond the reliable capabilities of most punched paper tape equipment. Tape cartridges used with the M201 are inexpensive, easily stored, asynchronous speeds up to 65 alphanumeric characters per second can be accommodated. Inputs and outputs are directly interchangeable with punched tape equipment. Each cartridge of 600' capacity holds an equivalent of 3500' of paper tape. All logic is self-contained, and since there are no cams, clutches, linkages or rapidly rotating shafts, wear and maintenance are reduced to a minimum.

Read-write rate: 65 characters/sec.

No. Channels: 8

Start-stop time: 3 msec (max)

Tape width: 1/4"

Rewind Time: 30 sec (approx)

Cartridge Capacity: 600'-350,000 char.

Input—logic levels

Output—relay contacts or logic levels

MODEL C-11 CARTRIDGE

DESCRIPTION

The Kennedy C-11 cartridge has a capacity of 300 feet of 1/2 inch 1.5 mil computer tape. Compact and rugged, it offers maximum protection for tape in applications where environmental conditions are difficult and where operator training is a problem. The following machines have been designed to utilize the C-11 and to take advantage of its many features: DS300, MR303, MR 303B, DSP340.

BRIEF SPECIFICATIONS

Tape Capacity: 300' 1.5 mil 1/2" computer tape.
400' 1 mil 1/2" computer tape.

Size: 8-1/4" x 5-1/2" x 1"

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